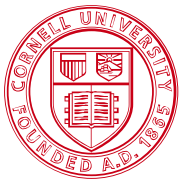

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Document Title:	Symbiotic Associations in Nature
Author:	Carly Faye Summers
Course:	Plant Pathology 1100
Course Title:	Symbiotic Associations in Nature
Year of Award:	Spring 2015

Winner

Spring 2015 James Slevin Assignment Sequence Prize

We are pleased to invite applications for the James F. Slevin Assignment Sequence Prize. This prize of $500 will be awarded to the teacher submitting the best sequence of writing assignments for a First-Year Writing Seminar (second place winners, if any, will receive $150).

Assignment sequences in a writing course are built around a series of essay topics. These sequences probably represent work assigned during a portion of the course rather than all of the essay assignments distributed over an entire semester. Submissions should include a rationale and a description of your plans for eliciting and responding to student drafts and revisions, as well as a description of how you prepare students for each essay assignment, for example by engaging them in preparatory writing exercises, including informal writing designed to help students understand the material on which they subsequently write formal essays. Reflections on what worked well, and why, and what you would change another time, are welcome.

The winner will be announced to the Cornell community. Winning entries will be deposited in the Knight Institute's web accessible archive and made available to other instructors under a creative commons attribution, non-commercial license. (See creativecommons.org for more information about cc licensing.)

To facilitate future searching of the Institute's archive, we ask that you provide a brief descriptive abstract (about 75 words) of your document, and a short list of appropriate keywords that might not appear in the text. Examples might include terms like "rhetorical situation," "style," "citation," etc. **Any borrowings such as quotations from course texts or handbooks must be cited properly in the document itself.**

Submissions are due in 101 McGraw Hall by Tuesday, May 19. No exceptions can be made.

Spring 2015 James F. Slevin Assignment Sequence Prize Application

~Please Print Clearly. Do **not** staple. Use paper clips only~

Instructor's name Carly Faye Summers

Department PLSA Course # and title 1100.101 Symbiotic Associations in Nature

Should I win a prize, I give the John S. Knight Institute permission to publish, quote from, and/or distribute copies of the assignment sequence, and to distribute publicity to newspapers and other publications, local and/or national, about my winning the prize. I also grant the Knight Institute permission to deposit the assignment sequence in a web accessible archive and make it available under a creative commons attribution, non-commercial license. I am prepared to send electronic versions of my text to Donna O'Hora (dlo1@cornell.edu) in the Knight Institute. I understand that I will receive the award for my prize-winning sequence upon submission of the electronic text.

Symbiotic Associations in nature

Title of Assignment Sequence

Instructor's signature C Summers Date 5/4/15

Rationale and Abstract

This class focused on the analysis, synthesis and evaluation of information through close reading, group discussions, oral presentations and writing exercises. The goal was to promote active learning and develop critical thinking skills, providing a foundation for clear communication through writing. Student writing and class discussions were based on readings from scientific journal articles describing research on symbiotic associations in nature.

Keywords

Active learning, structured reading groups, analysis, synthesis, evaluation

Preparatory Exercises

The assignments included in this sequence required the students to analyze and synthesize a great deal of scientific research in order to translate and summarize the take-home message in a thought-provoking, complete way. We practiced these skills through various modes, including oral presentations followed by class discussion. Students were given time in class to work with groups for oral presentations. This allowed me to work closely with each group to help students extract and refine their message. Students also worked in structured reading groups modelled after the style of Parrott and Cherry. Each student participated in distinct roles in order to extract the conceptual and methodological elements of the reading, modelling the teaching paradigm illustrated in 'Gowin's Vee', adapted from Waterman and Rissler's methods. Students also worked in groups for peer review of writing assignments.

Additional preparatory work included instruction of primary vs. secondary sources and demonstration of examples for thesis and essay organization. I reviewed each student's thesis for the following assignments, in order that we could individually discuss his/her approach to organization and ensure that the essay builds a complex thesis tying in the 'big picture' and impacts of the work. Because students were expected to perform a literature search, methods for this procedure were explained and demonstrated in class. The foundational exercises of the class involved brainstorming, organizing ideas, outlining, constructing a thesis and finally, revising writing.

Assignment Sequence

Essay 4: The Human Microbiome

4-5 pages

The human microbiome is a diverse environment filled with complicated relationships between millions of organisms. You are finding that we all contain this diverse ecosystem and it makes us who we are in ways science is only beginning to understand. You will be broken into groups and assigned a journal article describing scientific studies of the microbiome. You will then need to practice a literature search to find one primary scientific research article that contains information related to the article you were assigned. You will prepare for your essay assignment by working in

your group to create a class presentation that will explain the article, including the supporting scientific evidence you find, to your classmates. Finally, you will write an essay where you will: define the human microbiome, explain how symbioses shape the human as well as the microbes within, analyze the argument within your assigned article then support the claims within using the evidence you found in scientific articles (that you then cite in the paper).

Make sure these points flow by including the information as it fits with the thesis you develop for your paper. In your draft paper, you need to **highlight your thesis in bold font.** This will allow us to practice constructing and developing a thesis statement.

Groups:

Barr JJ, et al. 2013. *Bacteriophage adherence to mucus provide a non-host-derived immunity.* PNAS. 110 (26): 10771-10776.

Belkaid Y and TW Hand. 2014. *Role of the microbiota in immunity and inflammation.* Cell. 157: 121-141.

Collins S, et al. 2013. *The adoptive transfer of behavioral phenotype via the intestinal microbiota: experimental evidence and clinical applications.* Current Opinions in Microbiology. 16: 240-245.

Greenblum S, et al. 2012. *Metagenomic systems biology of the human gut microbiome reveals topological shifts associated with obesity and inflammatory bowel disease.* PNAS. 109 (2): 594-599.

Essay 5: Agroecosystems

5-6 pages

You will read two scientific papers: '*The ecological role of biodiversity in agroecosystems*' by Altieri and '*The plant microbiome*' by Turner, James and Pool. The first describes the landscape of agroecosystems and how agriculture shapes the organisms within the system and vice versa. The second zooms in to explain the microbial players at the individual plant level and how important they are to plant health. For your essay, you need to put the content of these two papers in your own words and answer the question, "Why is diversity important in agriculture?"

There is a great amount of information in the two papers. There is no way you will be able to or want to include all of the details in your essay. However, you need to outline the important take-home messages within each paper and use them to create your own outline and thesis. You will want to include examples of specific interactions and processes in order to reinforce your main points.

Essay 6

7-10 pages

You will be divided into 3 groups, each with a separate article and assignment. Each person will find one article to support specific information within their assigned article. Each group will have one class period to present the article and supporting information (~40 min presentation and 35 min

class discussion). Your essays will then be modeled from your presentation outline. See the rubrics from the previous presentation and essay for expectations. Citations and a bibliography should be included in the essay.

Note there is no question or specific prompt included in the descriptions below. You are expected to develop your own thesis for your essay. However, I do give you some points I'd like you to focus on (since the papers are complex).

Group 1: Expanding symbiosis concepts from the microcosmos to the macrocosmos

Assigned article:

Hird M. 2010. *Indifferent globality: Gaia, symbiosis and 'other worldiness'.* Theory, Culture and Society. 27 (2-3): 54-72.

This paper describes the importance of bacteria in the creation and maintenance of non-living factors on Earth that allow for life as we know it. These concepts have contributed to the "Gaia theory", or the theory that the Earth contains a homeostasis of interdependent interactions that practically function as a superorganism. While this paper has a philosophic thesis, I'd like you to focus your efforts on communicating and organizing the scientific concepts presented within that describe the relationship between microbes (specifically bacteria) and non-living factors on Earth that results in an over-arching, seemingly indirect, symbiosis with all life on Earth. Make sure to describe the biosphere connection to non-living matter (atmosphere, land, solar heat, climate and water cycle), the role of bacteria, and how this shapes life as we know it on Earth.

Group 2: Symbiosis and evolution of the human brain

Assigned article:

Stilling RM et al. 2014. *Friends with social benefits: host-microbe interactions as a driver of brain evolution and development?* Cellular and Infection Microbiology. 4(147):1-17.

This paper provides a theory for the complex ways in which microbial endosymbionts may have lead to the evolution and development of the human brain. As we previously learned, our microbiota affect our behavior in ways we are only beginning to understand. Implications between this link and the development of social behavior in humans are explored. In addition, the paper links symbionts to physiological improvements, like increased nutrient absorption from a broader range of foods, to the ability for our brains to utilize more energy and develop.

Group 3: Ancient indigenous agricultural practice: Harmonizing ecological sustainability and food security through elegant cooperation with symbioses in nature

Assigned article:

Altieri MA. 2004. *Linking ecologists and traditional farmers in the search for sustainable agriculture.* Frontiers in Ecology and the Environment. 2(1):35-42.

We have explored ways that symbiosis is important to natural processes. We've also explored ways that biodiversity is important for ecosystems and the ways modern agriculture is threatening natural homeostasis. However, traditional agriculture, for many reasons, is much more sustainable than conventional agriculture. This paper explains what traditional agriculture is, why it is important to study, and mechanisms by which it is more productive than conventional agriculture. For your presentation and essay, in addition to explaining the information given in the paper, provide additional examples of types of traditional agriculture, since each region of the world has developed different ways to deal with different crops and environmental qualities. The examples (some of which are shown in pictures and described in the article) are incredibly elegant, complex and beautiful to see. Try to use as many pictures in your presentation as possible. Explain where each system is developed, why and how it is effective (using your supporting articles). A few of my favorites I'd love to see are the terraces in Asia and the Andes, chinampas in Mexico, biochar in the Amazon, and forest gardens in various parts of the world.

Reflections

Giving the students the opportunity for group collaboration was an effective way to reinforce the central concepts I wanted to cover in the course. Group discussions of class readings were much more productive when we employed structured reading groups. Organizing information into an oral presentation greatly improved student writing and composition in the corresponding essays. This class structure provided me with the chance to work closely with each group, ask pointed questions and give helpful feedback. Revising each student's essay thesis prior to the completion of the draft process and peer review greatly improved writing quality as well. In the future, I will definitely do this much earlier in the course. I also plan to give examples of well-written theses in the beginning of the course. I found that focusing on thesis quality effectively strengthened student understanding of the material and the quality of the essay as a whole.

Resources

Parrot HM and E Cherry. 2011. *Using structured reading groups to facilitate deep learning.* Teaching Sociology. 39(4): 534-370.

Waterman MA and JF Rissler. 1982. *Use of scientific research reports to develop higher-level cognitive skills.* Journal of College Science Teaching. 11: 336-340.